

## LA-UR-17-26213

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Title: Sunray Sundown

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Intended for: LANL internal student presentation  
Report

Issued: 2017-07-24

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# Sunray Sundown

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ISR-3

27 July 2017

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# Sunray Sundown

Simon Rodman

Or:  
Trading the Cow which  
makes Golden Milk for a  
Goose Egg

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# Personal Background

- Grew up in Los Alamos
- 4<sup>th</sup> summer in ISR-3 – Get to spend time with family and work in a friendly and knowledgeable environment
- Low-level hardware considerations and system maintenance



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# The Golden Cow

- ~\$600/unit
- Fibre Ethernet
- 2 Display Connections
- No moving parts
- No user-writable storage



Image Source: [www.oracle.com](http://www.oracle.com)

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# The Golden Cow

- ~\$600/unit
- Fibre Ethernet
- 2 Display Connections
- No moving parts
- No user-writable storage

Also ~\$100/year/unit!



Image Source: [www.oracle.com](http://www.oracle.com)

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# Taking the Cow to Market

- In 2013 Oracle announced the discontinuation of the SunRay thinclients
- Hardware-wise, the SunRays are perfect for use at LANL. Finding an off-the-shelf replacement has so far been impossible



Image Source: <http://houston.cowparade.com/cow/detail/917>

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# Taking the Cow to Market

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Image Source: <http://houston.cowparade.com/cow/detail/917>

None of us on the outside have  
any idea why

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# Searching for the Golden Goose

- Two basic categories of options
  - Off-the-shelf Hardware
    - Usually only supports one software package
    - Can only find devices with a subset of desired features
  - Custom hardware
    - Large up-front cost, but we get everything we want
- Hybrid approaches are possible



Image Source:  
<https://jimhull.wordpress.com/2015/10/11/golden-goose-a-short-story/>

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# Off-the-shelf Hardware

- Dell Wyse 7040
  - ~\$1000/unit
  - Fibre and Copper ethernet
  - 2 Display Connections
  - Forced-air cooling (Fans)
  - Removable SSD

Image Source:  
<http://www.dell.com/en-us/work/shop/productdetails/wyse-7040-thin-client/xcto7040thin>

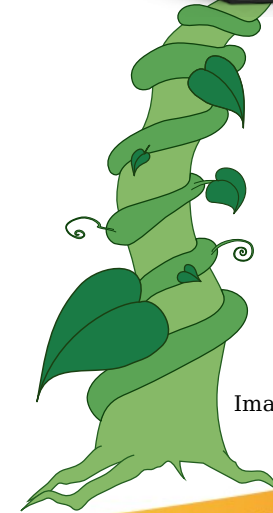


Image Source: <https://pixabay.com>

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# Off-the-shelf Hardware

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  - ~\$1000/unit
  - Fibre and Copper ethernet
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Sounds like any PC...

Image Source:  
<http://www.dell.com/en-us/work/shop/productdetails/wyse-7040-thin-client/xcto7040thin>

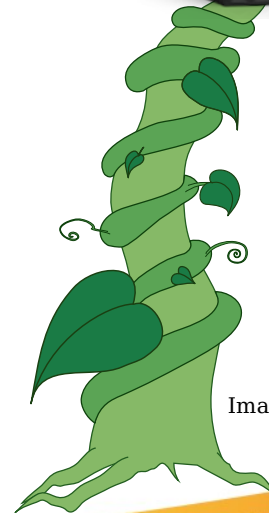


Image Source: <https://pixabay.com>

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Image Source:  
<https://www.element14.com/community/community/raspberry-pi/blog/2017/03/28/a-new-ruggedized-raspberry-pi-3-nepi>

# Custom Hardware

- Raspberry Pi-based?
  - ~\$300/unit
  - Hardware limits of a flip phone processor...
- Something else?
  - Design costs of a fully custom system
  - Still have to choose carefully to get all our desired features

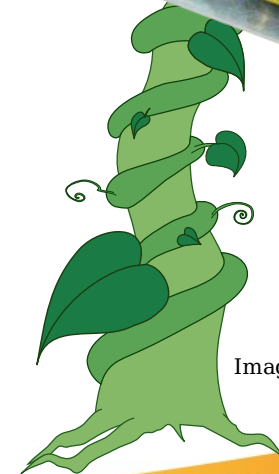
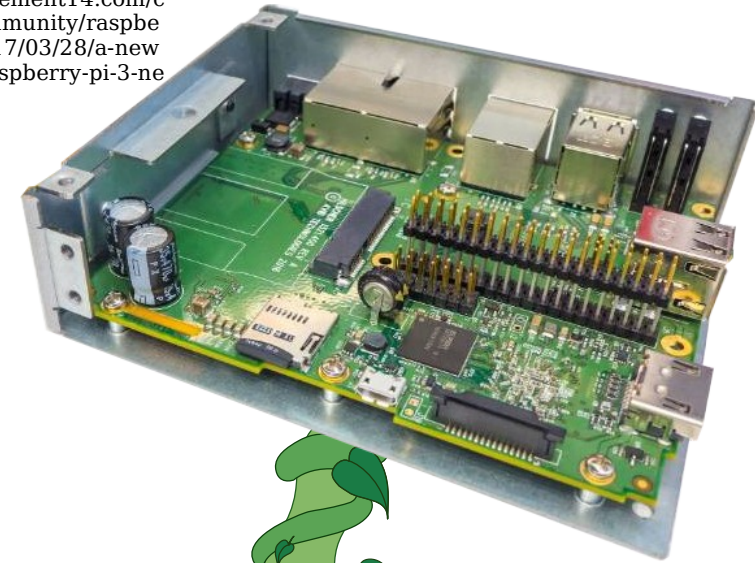


Image Source: <https://pixabay.com>

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Image Source:  
<http://www.congatec.com/us/products/smarc/conga-sa5.html>

# Semi-Custom Hardware

- Off-the-shelf Module
  - ~\$250/unit
  - Many modules available – most promising based on Intel Atom
- Custom Carrier
  - ~\$250/unit
  - Module-exported interfaces can be routed to whatever we want

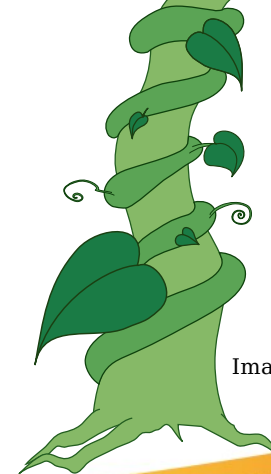


Image Source: <https://pixabay.com>

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# Conclusions and Future Work

- SunRay support officially ends at the end of this month.
  - Unofficially, Oracle says they will continue to provide 'basic' support for an 'indefinite' period
- Many possibilities exist for replacement
- I and others will continue down the roads with vendors to find a suitable replacement



Image Source:  
<https://www.cendio.com/campaigns/thinlinc-vs-sunray>

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# Thank you!

## Questions?

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